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ABSTRACT

A study was conducted to investigate the validity of the Armed Services Vocational Aptitude Battery (ASVAB) and of educational data for Air Force technical training, to investigate the unique contribution of both educational data and test data in predicting Air Force technical training success, and to assess homogeneity of prediction equations for sub-groups defined by race and sex. Data were collected by using ASVAB-Form 3 for all Air Force nonprior service enlisted accessions from September 1973 through October 1975. The analyses included 43 clusters of enlisted training courses (for example, intelligence, audiovisual, and weather). Both test data and educational background data proved useful for prediction of Air Force technical training performance; moreover, when used in combination with each other, more accurate predictions were possible than through the use of either alone. Generally, test data alone provided more accurate predictions than did educational background alone. In many instances, separate race or sex group prediction equations were not homogeneous (i.e., the sub-group equations differed from each other enough that added accuracy in prediction could be achieved by using a separate equation for each sub-group). Predictions based on educational information were more susceptible to race bias than those based on test data. (Tables of data appear throughout the report.) (LMS)

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AFHRL-TR-77-18

AIR FORCE HUMAN RESOURCES LABORATORY

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PREDICTION OF AIR FORCE TECHNICAL TRAINING SUCCESS FROM ASVAB AND EDUCATIONAL BACKGROUND

By

Lonnie D. Valentine, Jr.

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Lackland Air Force Base, Texas 78236

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Nonprior service Air Force accessions during September 1973 through October 1975 were used as the sample in a series of analyses to (a) determine utility of educational data in predicting technical training success, (b) validate ASVAB, Form 3, (c) determine extent of overlap between education data based predictions and test based predictions, and (d) assess race and sex equity of predictions. Major findings are that (a) both test data and educational background data contribute uniquely to prediction, (b) test data makes the largest unique contribution, and (c) some limited consideration of race and sex could improve predictions. Finding (c) applies only to a limited subset of the 43 training groups analyzed.

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PREFACE

This work was performed under project 7719, Air Force Personnel Systems Development on Selection, Assignment, Evaluation, Quality Control, Retention, Promotion, and Utilization; task 771910, Armed Forces Operational Selection and Classification Programs. This work responds to requirements of RPR 74-30, Methods for Predicting Technical School Success Using High School Transcripts, for which AFMPC/DPMYP is the Requirements Managers.

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PREDICTION OF AIR FORCE TECHNICAL TRAINING SUCCESS FROM ASVAB AND EDUCATIONAL BACKGROUND

I. SUMMARY

The objective of this study was to (a) investigate validity of the Armed Services Vocational Aptitude Battery (ASVAB) and of educational data for Air Force technical training, (b) investigate unique predictive contribution of both educational data and test data in predicting Air Force technical training success, and (c) assess homogeneity of prediction equations for subgroups defined by race and sex.

Data were collected using ASVAB-3 for all Air Force non-prior service enlisted accessions in September 1973 through October 1975. The analyses include 43 clusters of enlisted training courses based upon frequency counts of cases entered into various technical courses. The major criterion was final school grade (FSG).

Research results (since World War I) have frequently found that Blacks do less well on test measures than do Whites, possibly due to social, economic, and educational deprivation rather than potential. Sex fairness of tests is another problem currently in question by researchers. This study resulted from an Air Force Military Personnel Center (AFMPC) request for an investigation of the ethnic fairness of education data as opposed to test scores for classification.

Variables used in the study were (a) an Armed Forces Qualification Test (AFQT) score and four Air Force Aptitude Indexes (AI) (Mechanical, Administrative, General, and Electronics), (b) a series of 41 binary variables indicating successful completion or non-completion of 41 specific high school courses, (c) disposition from training (graduation vs. failure), (d) final school grade, (e) ethnic identity (caucasian, Black, or other minority, (f) sex (male or female), and (g) course cluster identity.

Half of the male Caucasians in each of the 43 clusters were randomly selected as an educational index (EI) development sample, and the remaining cases were used in cross-validation of the EI, validation of the ASVAB, and equity analyses. The EI was based on a unique key derived from the binary course completion variable for each case in each of the 43 clusters.

Each of the clusters was divided into race subsamples and then redivided into subsamples of males and females. Validities, using FSG as criterion, were then obtained for (a) the total sample within each cluster, (b) the subsamples within each cluster defined by race, and (c) the subsamples within each cluster defined by sex.

Regressions were run to test the contribution of educational data to test data and test data to educational data in prediction of FSG.

Tests of race and sex homogeneity were run for prediction models based on test data only, educational data only, and test and educational data combined.

Results indicated higher zero-order validities for test data than educational data. The AFQT validity was almost as high, and in some cases higher, than the aptitude composite validities. Findings show predictions based on educational information are more susceptible to race bias than those based on test data. Data also indicated that race and sex unique predictions based on test and/or educational data are not homogeneous.

Files are presently being augmented with new item response data. Later investigations will examine appropriateness of composites as presently constituted, seek more valid composites, consider the number of composites needed, and will examine fairness of these with respect to both race and sex in anticipation of providing data for test battery revision and improvement.

II. BACKGROUND

Since World War I, a consistent research finding has been that Blacks generally perform less well on test measures than do Whites. This general finding has held regardless of the test's cognitive content. It has been assumed by some that the lower test performance of Blacks does not represent their true potential, but rather reflects social, economic, and educational deprivation. As a consequence, it has become fashionable to attack test measures as being unfair to minority individuals and irrelevant to the accurate prediction of later performances. More recently, similar concerns about employment opportunities for women have been voiced, especially with respect to mechanical and other traditionally male jobs. However, there has been relatively little research of note with respect to sex fairness of tests.

Numerous studies have been designed to assess test fairness or to seek alternative measures which accurately reflect the relevant potential of various cultural subgroups. It is noted that a test can be described as biased only in the context of a later criterion event. Group difference in test performance, no matter how large, is not indicative of measurement bias when the difference is associated with a comparable difference in a criterion of concern. As early as 1953, Mary Agnes Gordon reported a study in which such a definition of bias was implicit; she found that regression equations of final tech school grade on aptitude composites were essentially the same for Whites and Blacks and concluded that the use of the same minimum qualification scores was justified.

Other studies (e.g., Kirkpatrick, Ewen, Barrett, & Katzell, 1968; Lopez, 1966) have tended to substantiate the claim that Black criterion performance may be underestimated by selection procedures, while still a different group of studies (Campbell, 1964; Guinn, Tupes, & Alley, 1970a, 1970b; Shore & Marion, 1972; Tenopyr, 1967) have found that Black criterion performance tends to be overestimated by tests. Many of these studies have been subjected to criticism which has generally hinged on differing definitions of bias; numerous models for fairness in selection test use have been proposed to optimize various definitions of equitable or fair employment opportunity. For a summary of these models, see Cole, 1973. It is important that research demonstrate not only overall predictive utility of selection measures but utility and similarity of relationship within various subpopulations as well. Beyond that, the decision about the way in which a valid test is to be used is a policy matter.

In September 1973, the Air Force discontinued use of the AFQT and the Airman Qualifying Examination (AQE) for nonprior service enlisted selection and initial classification in favor of the ASVAB. In computation of AI for the AQE, extra raw score points were awarded for completion of certain high school courses. This was based on a series of studies which had demonstrated unique predictive validity for high school course information in the context of test data (Brokaw, 1963; Judy, 1960, 1965; Lecznar, 1964).

In the conversion to ASVAB, educational points were dropped from the composites. This was mainly because inclusion of such points penalized service applicants who were tested while still in high school; this was critical after the decision to accept scores achieved in the institutional testing program for enlistment purposes following graduation. In addition, subsequent analyses indicated that, in operational application, educational data's contribution to validity was relatively minor (usually enhancing validity by about .05 correlational points), but its inclusion increased correlation among composites by an appreciable amount.

Because in the late 1960s and early 1970s tests had come under such extreme criticism as being biased toward minorities, it was thought that research into selection and classification techniques other than traditional aptitude tests might prove worthwhile. Consequently, an investigation of the ethnic fairness of educational data was initiated. However, a review of previous Air Force research on use of educational data indicated that:

1. Race and sex were not included as variables in the studies.

2. Typically, validity of the AQE's selector composite for a specialty was higher than the validity of a composite of educational variables.

3. Educational variables contributed significantly to test variables in the prediction of training success, but their unique contribution was less than the unique contribution of test variables.

Purposes of this study are to (a) investigate validity of the ASVAB and of educational data for Air Force technical training, (b) investigate unique predictive contribution of both educational data and test data in predicting Air Force technical training success, and (c) assess homogeneity of prediction equations for subgroups defined by race and sex. Data assembled for these analyses cover Air Force accessions for September 1973 through October 1975, a period when ASVAB Form 3 was used for Air Force production testing.

Data Description

A basic data file was developed from a collation of the Air Force's Processing and Classification of Enlistees (PACE) file with Air Force technical training files. The file included all Air Force nonprior service enlisted accessions in September 1973 through October 1975. Frequency counts of cases entered into various technical courses were obtained; on the basis of these counts and consideration of course similarity, specialties were aggregated into 45 clusters for analysis. Inspection of technical training data on these 45 clusters

revealed that, for two of them, final course data were not recorded; consequently, analyses reported here are based on 43 clusters of enlisted training courses. In this respect, it is noted that, generally, course attrition rates were quite low. As a result of this extreme split, a pass/fail dichotomy was judged to be a fairly poor criterion for the main analyses; FSG, which reflects differences in end product "quality," was used as the major criterion.

Variables retained in the working file were (a) an AFQT score and four Air Force AIs (Mechanical, Administrative, General, and Electronics), all derived from ASVAB-3; (b) a series of 41 binary variables indicating successful completion or non-completion of 41 specific high school courses (coded 1 for successful completion, 0 otherwise); (c) disposition from training (graduation vs. failure); (d) final school grade (available on graduates only); (e) ethnic identity (caucasian, Black, or other minority); (f) sex (male or female); and (g) course cluster identity.

Procedure

The basic working file was divided quasi-randomly into two files. Within each of the 43 clusters, half of the available caucasian males were randomly selected as an EI development sample; restriction to this one group was to avoid depletion of minority cases for later phases of the analyses. Remaining cases were held out in a second file for use in cross-validation of the EI, validation of the ASVAB, and use in equity analyses.

For each of the 43 clusters, the EI sample was divided into an upper and lower criterion group from consideration of the two criterion variables. Failure cases (for whom no FSG was available) were assigned to the lower group along with those graduates with the lowest FSGs. The 41 binary high school course variables were item analyzed against this dichotomy, and the significantly positively correlated (at the .05 level or better) ones were assigned a scoring weight of +1 while those showing significant negative correlation were assigned a scoring weight of -1. The EI development samples were excluded from all succeeding analyses; thus, all validities reported in the study represent cross-validation values.

For each remaining case in each of the 43 clusters, the educational variables were scored to obtain an EI using the key derived, as described above. Note that a unique key was used for each of the 43 clusters (i.e., the key was based on analysis within that cluster). All subsequent analyses were based on the holdout cases, and analyses were conducted for each cluster separately.

Validities of all test measures and of the EI were computed for subsamples (defined by race and by sex) in each of the 43 clusters. To accomplish this, the sample was first divided into subsamples of caucasians, Blacks, and other minority members, and validations were accomplished for these race subsamples. They were then redivided into subsamples of males and females, and the validations were accomplished separately for sex subsamples. In addition, validities were computed for the total sample within each cluster (i.e., for the cluster sample without regard to ethnic identity or sex). The criterion used for these validations was final school grade. The within-subgroup validations were accomplished only for subgroups with 24 or more cases. The total number of cases in a cluster, therefore, is not necessarily the sum of race or sex subsamples upon which subsample validations were based since the clusters include subsamples with less than 24 cases.

Since current Air Force selection and initial assignment is based upon consideration of both the AFQT score and one of the four AIs (Mechanical, Administrative, General, or Electronics), three regression models for use in testing the contribution of educational data to test data in prediction of final school grade and of test data's contribution to educational data in making these same predictions were established for each cluster. The full model employed the AFQT, the Selector AI, and the EI as predictors of FSG. The second restricted model used AFQT and the Selector AI as predictors, and the third model employed only the EI as a predictor. Comparison through the F statistic of predictive effectiveness of the full model with the predictive effectiveness of the second model tests the independent contribution of the EI to prediction (the null hypothesis is that the EI, considered in the context of the test data, makes no contribution to prediction of FSG). Similar comparison of the full model with the third model tests the hypothesis that the test data contribute nothing to prediction when considered in the context of the EI.

For each case in the cross-validation samples, a file of certain basic predictors and a series of generated variables was established for use in testing race and sex equity hypotheses. Variables employed are identified as follows:

(R) Three ethnic identity variables—each variable was binary (coded 1 if a member of a defined race group, 0 otherwise). The groups coded were caucasian, Black, and other minority.

(S) Two sex identity variables—binary variables identifying cases as male or female.

(QT) AFQT score—a continuous score from ASVAB which is used for initial selection decisions.

(SAI) Selector AI—a continuous score from ASVAB used in making initial assignments; score used was the usual selector score for the job cluster.

(EI) Education Index—derived from the 41 educational variables which were keyed against training success.

(RXQT) Three variables for interaction of race with AFQT—obtained as the product of each ethnic identity variable in turn with the AFQT score (thus, for a specific race group, the interaction variable consists of AFQT score for members of that group, and of zero values for non-members).

(RXAI) Three variables for interaction of race with the selector AI computed like (RXQT) above, but using Selector AI rather than AFQT.

(RXEI) Three variables for interaction of race with EI computed like (RXQT) above, but using the EI rather than AFQT.

(SXQT) Two variables for interaction of sex with AFQT computed as the product of the sex identity variables with AFQT.

(SXAI) Two variables for interaction of sex with selector AI—computed as the product of sex identity variables with the Selector AI.

(SXEI) Two variables for interaction of sex with the EI—computed as the product of sex identity variables with the EI.

To ascertain homogeneity of separate race and sex prediction equations, a series of regression models was established and compared via the F statistic. The full models consisted of the appropriate binary membership variables (for race or sex) and the appropriate interactions. Comparison of the predictive efficiency of this model with the predictive efficiency of appropriate basic predictors only tests the hypothesis that race (or sex) regressions are homogeneous. If this comparison is significant, then comparison of the full model with a model in which the appropriate basic predictor variables and membership variables are included, but from which the interaction variables are excluded, tests for homogeneity of regression slopes.

If the hypothesis of equation homogeneity is rejected, equation differences can be a function of (a) different equation slopes (i.e., differing increases in predictor value per unit of criterion increase), (b) different intercepts (i.e., equation constants), or (c) some combination of (a) and (b). Thus, if the hypothesis of equation homogeneity is rejected, proper procedure is to test next for slope homogeneity; if slope homogeneity is *not* rejected, it can be assumed that the difference is attributable to intercept. Moreover, if the slope homogeneity hypothesis is rejected, then the question of intercept homogeneity is meaningless since, with differing slopes, distance between the regression lines differs at different levels (intercept is only one point along these lines). Shore and Marion (1972) provide useful definitions of the meaning of slope and intercept, and might be useful to the reader who wishes detailed definitions of these terms.

Tests of race and sex homogeneity were run for prediction models based on test data only (AFQT and the Selector AI), educational data only (EI), and for test and educational data combined.

It should be noted that all correlational values computed and reported in this study are obtained values which *have not* been corrected for range restriction. This is because the assumptions of such corrections are not *met* by the data; specifically, the test predictors are normed on a rectangular, rather than normal, metric, and selection based on them is complex, not meeting the selection assumptions of the range correction formulae. Consequently, all validity values reported are underestimates of "full range" validity.

III. RESULTS

Table 1 lists the 43 job clusters used in this study and shows the number of cases in the cross-validation sample (Total N) along with the N's available within each of the race and sex subsamples. A blank entry for a subsample indicates a cell with too small an N for separate analysis. The cases were used in overall analyses. For example, in group 09 (Training Devices) of the total N of 176, 170 were caucasian (leaving only eight ethnic minority cases). It should be noted that ethnic minority and female cases enumerated here represent all available cases for the time period covered in the study; however, caucasian and male counts are reduced because a random half of the

Table 1. **Within Subgroup Sample Sizes**

Group	Job Area	Cauc N	Black N	Other Min. N	Male N	Female N	Total N[a]
01	Intelligence (20X30)	245	43	–	235	55	290
02	Audiovisual (23X30)	171	43	–	183	31	214
03	Weather (25X3X)	317	55	–	278	96	374
04	Command Control Systems Operator (27X3X)	664	230	–	790	115	905
05	Communications Operations (29130)	369	195	–	409	158	567
06	Communications-Electronics Systems (30X3X)	1,849	181	53	1,740	343	2,083
07	Missile Electronic Maintenance (31X3X)	544	53	–	517	95	612
08	Avionics Systems (32X3X)	2,163	244	57	2,014	450	2,464
09	Training Devices (34X3X)	170	–	–	158	–	178
10	Wire Communications Systems Maintenance (361/3X0)	226	66	–	303	–	303
11	Wire Communications Systems Maintenance (362X0)	224	69	–	287	–	302
12	Intricate Equipment Maintenance (40X3X)	75	24	–	101	–	103
13	Aircraft Accessory Maintenance (42X3X)	1,598	1,041	98	2,187	550	2,737
14	Aircraft Accessory (43130)	193	–	–	177	44	221
15	Aircraft Maintenance (43131)	4,559	1,073	104	4,468	1,268	5,736
16	Aircraft Engineer (4323X)	1,356	363	44	1,431	332	1,763
17	Missile Maintenance (44X3X)	241	52	–	259	36	295
18	Munitions and Weapons Maintenance (46130)	832	162	–	1,008	–	1,008
19	Munitions and Weapons Maintenance (46230)	912	154	–	1,084	–	1,084
20	Munitions and Weapons Maintenance (46330)	194	–	–	208	–	209
21	Vehicle Maintenance (47X3X)	251	28	–	282	–	282
22	Computer Systems (51X3X)	251	–	–	183	86	269
23	Metal Working (53X3X)	653	160	–	659	168	827
24	Mechanical/Electrical (54X3X)	831	297	–	970	181	1,151
25	Structural/Pavements (55X3X)	505	75	–	471	119	590
26	Sanitation (56330)	215	36	–	251	–	251
27	Fire Protection (57130)	507	188	–	709	–	711
28	Fabric and Rubber Products (58X30)	178	42	–	194	29	223
29	Transportation (60X3X)	1,106	400	40	1,346	200	1,546
30	Food Service (62X3X)	256	136	–	284	117	401
31	Fuel Services (63130)	367	265	–	644	–	646
32	Inventory Management (64530)	1,199	587	83	1,313	556	1,869
33	Material Facilities (64730)	481	360	–	541	317	858
34	Accounting and Finance, and Auditing (67X3X)	439	100	–	372	179	551
35	Administration (70X3X)	1,503	1,078	56	1,716	921	2,637
36	Personnel (73230)	453	180	–	463	185	648
37	Security Police (81130)	2,172	1,222	44	3,438	–	3,438
38	Law Enforcement and Corrections (81230)	1,078	256	–	900	448	1,348
39	Medical (90010)	934	404	28	912	454	1,366
40	Medical (90X3X)	1,385	470	48	1,283	620	1,903
41	Medical (91X3X)	249	48	–	251	49	300
42	Aircrew Protection (92230)	332	63	–	339	63	402
43	Dental (98X3X)	241	68	–	212	108	320

[a]Race N's or Sex N's do not necessarily equal total N. This is because the subsample N's are shown only for subsamples with 24 or more cases on which within subsample validities were computed.

available caucasian males were used for EI development only and were excluded from subsequent analyses.

Table A1 (Appendix A) shows means and standard deviations of the EI, Selector AI (i.e., the ASVAB composite used for selection for the specialty), the AFQT, and FSG for both total sample and race defined subgroups while Table A2 (Appendix A) shows similar statistics for sex defined subgroups. Generally, minority race means on all variables tended to be lower than caucasian means except on the EI on which differences favored minorities about as often as they favored caucasians. With respect to the sex breakout, results were mixed; generally, female means on the Selector AI for mechanical specialties tended to be considerably lower than that of males. Clusters 10 (Wire Communications Systems Maintenance), 18 and 19 (Munitions and Weapons Maintenance), 21 (Vehicle Maintenance), 26 (Sanitation), and 37 (Security Police) contained no female cases.

Table 2 reports zero-order validities of the EI, the AFQT, and the four Air Force classification composites against FSG for ethnic and sex subsamples, as well as for the total sample in each job cluster. It should be emphasized that all of these correlations represent cross-validations since cases utilized in EI development were excluded from this and subsequent phases of the analyses: these correlations are not corrected for range restriction. It can be seen from these data that, generally, the measures have useful predictive validity across race and sex subsamples. Generally, the test data exhibit a higher zero-order validity than does the EI. In addition, it can be seen that the AFQT usually exhibits validity almost as high as (or in some cases higher than) the aptitude composites; this would be expected since the AFQT was designed to measure academic ability while the aptitude composites were designed to deal with other facets of relevant ability.

Table 3 reports the multiple correlation of the EI, the Selector AI, and AFQT with FSG for the total sample in each of the 43 job clusters; in addition, it gives validity for the EI only and for AFQT and the Selector AI in combination. It also reports F ratios for contribution of the EI and of the two test measures to the full multiple.

In this table, all F ratios not marked by a symbol are significant at the .01 level. Inspection of the table shows that, generally, both the EI and the tests are valid for predicting FSG with the test scores typically being more valid than the educational data. In addition, both kinds of data generally contribute significantly to prediction. In only one instance out of these 86 F ratios for contribution to prediction was a nonsignificant F found, and in only six instances was the F significant only at the .05 level. All six of these F's were for contribution of educational data. All remaining F's were significant beyond the .01 level. Implication of the data in this table is that both test and educational data are independently useful in predicting FSG, but, of the two kinds of data, test data yield the largest contribution.

To test hypotheses about homogeneity of separate race or sex regression equations, a series of regression problems involving race membership, sex membership, AFQT, the Selector AI, the Education Index, and interactions of race or sex membership with the other variables as predictors of FSG were computed. Table 4 lists the problems computed. Table 5 lists the hypotheses tested from these problems and indicates which problems were compared to test each hypothesis. Sub-hypotheses were tested only when the main hypothesis was rejected. These regression problem computations and hypothesis tests were conducted separately for each of the 43 separate groups.

Tables 6, 7, and 8 summarize tests of hypotheses about homogeneity of FSG prediction equations for the three ethnic groups employed in the study. For the 43 job clusters, Table 6 presents data on hypotheses regarding homogeneity of regressions based on AFQT and the Selector AI; Table 7 presents similar data for predictions based on the EI; Table 8 presents these data for regressions based on AFQT, the Selector AI, and the EI. Tables 9, 10, and 11 present similar data with respect to homogeneity of separate regressions for males and females. The six hypotheses from these tables are stated in Table 5 and are repeated in a footnote to the table summarizing their F's. In each case, the main hypothesis (i.e., that the separate race or sex equations are essentially the same) was tested. The sub-hypothesis (i.e., the hypothesis that the equations' slopes are the same) was tested only when the main hypothesis was rejected.

With respect to homogeneity of separate race equations, Tables 6, 7, and 8 show outcomes of the analyses. For test based predictions (Table 6), the main hypothesis was rejected for 26 of the 43 clusters; for 10 of these 26, the hypothesis of common slopes was rejected. By contrast, for the EI based predictions, the hypothesis of homogeneous equations was rejected in 41 of the 43 groups, with the homogeneous slopes

Table 2. **Educational Index and ASVAB Composite Validities Against Final School Grade**

Group	Sample	Educ Index	ASVAB Composite				
			AFQT	Mech	Adm	Gen	Elect
01	Caucasian	.40	.39	.23	.25	.38	.38
	Black	.24	.28	.27	.27	.43	.22
	Other Minority	–	–	–	–	–	–
	Male	.38	.39	.26	.31	.37	.35
	Female	.39	.51	.00	.31	.43	.34
	Total	.38	.42	.25	.30	.40	.37
02	Caucasian	.38	.26	.21	.40	.31	.30
	Black	.40	–.02	.29	.30	.28	.31
	Other Minority	–	–	–	–	–	–
	Male	.39	.24	.31	.41	.31	.35
	Female	.43	.45	.27	.45	.48	.48
	Total	.40	.26	.30	.41	.33	.35
03	Caucasian	.30	.32	.26	.17	.27	.37
	Black	.22	.27	–.23	–.08	.28	.02
	Other Minority	–	–	–	–	–	–
	Male	.26	.42	.27	.26	.34	.41
	Female	.17	.24	.30	.21	.11	.21
	Total	.25	.38	.28	.22	.28	.37
04	Caucasian	.23	.37	.25	.12	.33	.33
	Black	.20	.24	.16	.11	.27	.19
	Other Minority	–	–	–	–	–	–
	Male	.21	.39	.30	.17	.35	.37
	Female	.28	.31	.23	.01	.29	.28
	Total	.22	.38	.28	.14	.35	.34
05	Caucasian	.29	.32	.19	.27	.36	.29
	Black	.19	.16	.17	.11	.23	.17
	Other Minority	–	–	–	–	–	–
	Male	.25	.28	.26	.28	.35	.30
	Female	.29	.31	.15	.20	.32	.26
	Total	.26	.29	.21	.25	.34	.27
06	Caucasian	.29	.33	.22	.22	.35	.44
	Black	.24	.30	.08	–.01	.30	.34
	Other Minority	.03	.21	.07	.17	.02	.30
	Male	.29	.33	.24	.23	.35	.43
	Female	.29	.43	.15	.28	.46	.47
	Total	.28	.34	.23	.21	.34	.44
07	Caucasian	.36	.35	.22	.21	.30	.45
	Black	.06	.37	–.08	.26	.42	.40
	Other Minority	–	–	–	–	–	–
	Male	.31	.36	.22	.26	.32	.48
	Female	.22	.46	.24	.20	.34	.31
	Total	.30	.37	.22	.23	.31	.45
08	Caucasian	.27	.28	.18	.20	.30	.32
	Black	.31	.21	.26	.14	.20	.35
	Other Minority	.09	.43	.22	.13	.18	.29
	Male	.27	.27	.28	.22	.30	.34
	Female	.27	.40	.13	.27	.29	.27
	Total	.27	.29	.22	.21	.29	.33
09	Caucasian	.35	.32	.25	.35	.33	.32
	Black	–	–	–	–	–	–
	Other Minority	–	–	–	–	–	–
	Male	.34	.30	.38	.36	.32	.34
	Female	–	–	–	–	–	–
	Total	.32	.32	.26	.37	.33	.32

Table 2 (*Continued*)

Group	Sample	Educ Index	ASVAB Composite AFQT	Mech	Adm	Gen	Elect
10	Caucasian	.30	.27	.26	.21	.32	.32
	Black	.05	−.05	.25	.15	.18	.12
	Other Minority	–	–	–	–	–	–
	Male	.23	.26	.29	.23	.31	.32
	Female	–	–	–	–	–	–
	Total	.23	.26	.29	.23	.31	.32
11	Caucasian	.26	.27	.12	.22	.27	.28
	Black	.08	.18	.13	.16	.17	.00
	Other Minority	–	–	–	–	–	–
	Male	.21	.27	.27	.19	.22	.23
	Female	–	–	–	–	–	–
	Total	.20	.30	.20	.23	.26	.25
12	Caucasian	.44	.45	.38	.41	.54	.47
	Black	.15	.10	.10	.07	.22	−.01
	Other Minority	–	–	–	–	–	–
	Male	.37	.48	.44	.39	.56	.48
	Female	–	–	–	–	–	–
	Total	.40	.49	.45	.40	.55	.50
13	Caucasian	.29	.32	.43	.14	.31	.36
	Black	.21	.19	.23	.11	.22	.28
	Other Minority	.16	.29	.3	.20	.41	.31
	Male	.23	.33	.40	.26	.35	.36
	Female	.29	.34	.35	.18	.35	.31
	Total	.26	.31	.40	.18	.31	.36
14	Caucasian	.30	.39	.39	.21	.23	.49
	Black	–	–	–	–	–	–
	Other Minority	–	–	–	–	–	–
	Male	.34	.44	.48	.34	.37	.53
	Female	.20	.63	.15	.42	.36	.32
	Total	.31	.43	.45	.25	.30	.50
15	Caucasian	.26	.30	.34	.16	.32	.36
	Black	.18	.14	.12	.06	.15	.19
	Other Minority	.15	.40	.24	.28	.30	.38
	Male	.23	.36	.38	.25	.36	.39
	Female	.20	.26	.10	.22	.30	.18
	Total	.24	.32	.34	.18	.31	.36
16	Caucasian	.35	.41	.40	.28	.37	.46
	Black	.22	.18	.29	.27	.27	.25
	Other Minority	.28	.34	.52	.43	.36	.45
	Male	.31	.46	.49	.40	.46	.49
	Female	.32	.32	.00	.32	.32	.32
	Total	.32	.42	.43	.33	.40	.46
17	Caucasian	.24	.31	.24	.25	.26	.26
	Black	.06	.23	.23	−.08	.19	.20
	Other Minority	–	–	–	–	–	–
	Male	.14	.35	.32	.25	.28	.31
	Female	.60	.38	.21	.48	.38	.18
	Total	.19	.34	.29	.26	.28	.29
18	Caucasian	.27	.35	.32	.21	.34	.34
	Black	.11	.08	.25	.11	.13	.11
	Other Minority	–	–	–	–	–	–
	Male	.21	.32	.34	.23	.32	.32
	Female	–	–	–	–	–	–
	Total	.21	.32	.34	.23	.32	.32

Table 2 (*Continued*)

Group	Sample	Educ Index	ASVAB Composite AFQT	Mech	Adm	Gen	Elect
19	Caucasian	.25	.36	.26	.22	.33	.36
	Black	.10	.18	.05	.06	.24	.27
	Other Minority	–	–	–	–	–	–
	Male	.22	.37	.27	.22	.34	.37
	Female	–	–	–	–	–	–
	Total	.22	.37	.27	.22	.34	.37
20	Caucasian	.47	.37	.38	.31	.38	.46
	Black	–	–	–	–	–	–
	Other Minority	–	–	–	–	–	–
	Male	.45	.45	.39	.36	.45	.46
	Female	–	–	–	–	–	–
	Total	.45	.42	.42	.32	.42	.46
21	Caucasian	.27	.38	.51	.23	.37	.50
	Black	.06	.17	.13	.15	.05	.29
	Other Minority	–	–	–	–	–	–
	Male	.26	.40	.53	.25	.39	.51
	Female	–	–	–	–	–	–
	Total	.26	.40	.53	.25	.39	.51
22	Caucasian	.14	.30	.04	.25	.24	.20
	Black	–	–	–	–	–	–
	Other Minority	–	–	–	–	–	–
	Male	.11	.32	.07	.28	.20	.29
	Female	.20	.36	.24	.22	.42	.31
	Total	.13	.32	.05	.27	.26	.24
23	Caucasian	.24	.38	.26	.26	.33	.35
	Black	.20	–.02	–.08	–.03	–.03	.12
	Other Minority	–	–	–	–	–	–
	Male	.23	.36	.33	.26	.28	.33
	Female	.27	.38	.01	.28	.38	.37
	Total	.24	.36	.24	.25	.30	.34
24	Caucasian	.22	.34	.40	.18	.36	.37
	Black	.15	.24	.22	.18	.19	.28
	Other Minority	–	–	–	–	–	–
	Male	.17	.38	.46	.26	.38	.39
	Female	.29	.35	.11	.30	.43	.29
	Total	.18	.36	.40	.21	.35	.38
25	Caucasian	.15	.20	.29	.11	.15	.26
	Black	.05	.19	.24	.02	.06	.06
	Other Minority	–	–	–	–	–	–
	Male	.15	.24	.40	.15	.20	.24
	Female	.06	.30	.02	.26	.22	.30
	Total	.16	.24	.34	.12	.17	.26
26	Caucasian	.44	.37	.44	.28	.40	.38
	Black	.33	.03	.22	.22	.15	.28
	Other Minority	–	–	–	–	–	–
	Male	.37	.36	.45	.33	.39	.41
	Female	–	–	–	–	–	–
	Total	.37	.36	.45	.33	.39	.41
27	Caucasian	.24	.22	.28	.21	.19	.25
	Black	.15	.12	.01	.09	.12	.05
	Other Minority	–	–	–	–	–	–
	Male	.20	.29	.35	.26	.24	.30
	Female	–	–	–	–	–	–
	Total	.20	.28	.34	.26	.23	.30

Table 2 (*Continued*)

Group	Sample	Educ Index	ASVAB Composite AFQT	Mech	Adm	Gen	Elect
28	Caucasian	.37	.25	.39	.12	.09	.23
	Black	−.13	.12	.21	.24	−.08	.03
	Other Minority	–	–	–	–	–	–
	Male	.27	.28	.47	.21	.06	.24
	Female	.44	.31	−.09	.10	.28	.32
	Total	.28	.28	.41	.19	.09	.25
29	Caucasian	.32	.44	.19	.24	.39	.34
	Black	.22	.10	.05	.00	.14	.13
	Other Minority	.09	.38	.21	−.05	.31	.14
	Male	.27	.43	.32	.18	.37	.37
	Female	.30	.39	.13	.21	.43	.39
	Total	.28	.43	.23	.20	.38	.35
30	Caucasian	.07	.13	−.05	.17	.03	−.03
	Black	.09	.02	.04	.00	−.16	.08
	Other Minority	–	–	–	–	–	–
	Male	.06	.11	.19	.02	−.02	.14
	Female	.22	.18	.14	.09	.08	.14
	Total	.09	.10	.03	.12	−.04	.03
31	Caucasian	.17	.31	.40	.12	.28	.32
	Black	.17	.05	.12	.07	.12	.18
	Other Minority	–	–	–	–	–	–
	Male	.15	.29	.39	.20	.26	.35
	Female	–	–	–	–	–	–
	Total	.15	.29	.39	.19	.26	.34
32	Caucasian	.28	.32	.17	.15	.38	.30
	Black	.26	.11	.09	.03	.21	.17
	Other Minority	.19	.41	.15	.10	.23	.37
	Male	.26	.33	.24	.12	.37	.33
	Female	.29	.24	.12	.16	.28	.25
	Total	.27	.30	.18	.13	.34	.29
33	Caucasian	.21	.32	.19	.19	.34	.27
	Black	.15	.13	.02	.09	.07	.09
	Other Minority	–	–	–	–	–	–
	Male	.14	.25	.23	.21	.16	.25
	Female	.22	.35	.16	.16	.39	.28
	Total	.17	.29	.17	.19	.26	.25
34	Caucasian	.27	.41	.25	.04	.44	.41
	Black	.22	.24	.23	−.06	.26	.34
	Other Minority	–	–	–	–	–	–
	Male	.30	.36	.26	.03	.37	.41
	Female	.12	.50	.29	.04	.52	.42
	Total	.25	.41	.27	.03	.43	.41
35	Caucasian	.23	.33	.17	.22	.35	.28
	Black	.23	.20	.07	.08	.22	.17
	Other Minority	.18	.08	.12	.10	.08	.13
	Male	.27	.32	.24	.19	.31	.32
	Female	.18	.31	.19	.19	.33	.27
	Total	.23	.32	.16	.20	.32	.27
36	Caucasian	.33	.50	.23	.26	.50	.41
	Black	.31	.26	.00	.07	.18	.18
	Other Minority	–	–	–	–	–	–
	Male	.36	.52	.28	.22	.46	.46
	Female	.25	.43	.37	.27	.47	.36
	Total	.33	.50	.25	.24	.46	.41

Table 2 (*Continued*)

Group	Sample	Educ Index	ASVAB Composite AFQT	Mech	Adm	Gen	Elect
37	Caucasian	.27	.29	.19	.20	.21	.24
	Black	.20	.13	.16	.09	.05	.13
	Other Minority	.50	.44	.47	.24	.28	.47
	Male	.24	.30	.29	.23	.21	.28
	Female	–	–	–	–	–	–
	Total	.24	.30	.29	.23	.21	.28
38	Caucasian	.32	.35	.31	.22	.39	.38
	Black	.33	.32	.13	.22	.29	.28
	Other Minority	–	–	–	–	–	–
	Male	.28	.39	.28	.33	.38	.39
	Female	.29	.33	.26	.29	.38	.30
	Total	.30	.38	.32	.26	.39	.39
39	Caucasian	.38	.39	.25	.23	.38	.37
	Black	.20	.21	.10	.13	.12	.22
	Other Minority	.12	.43	.32	.49	.25	.63
	Male	.31	.45	.39	.27	.36	.47
	Female	.37	.34	.27	.29	.33	.36
	Total	.32	.42	.29	.28	.34	.40
40	Caucasian	.35	.39	.25	.21	.37	.37
	Black	.26	.24	.16	.16	.26	.22
	Other Minority	.19	.49	.48	.33	.45	.35
	Male	.35	.44	.41	.34	.42	.43
	Female	.30	.39	.24	.17	.29	.36
	Total	.33	.42	.30	.28	.38	.38
41	Caucasian	.31	.37	.22	.23	.37	.30
	Black	.30	.09	−.06	.19	.27	.07
	Other Minority	–	–	–	–	–	–
	Male	.36	.33	.30	.28	.36	.31
	Female	.05	.44	.19	.00	.44	.34
	Total	.31	.35	.21	.25	.37	.30
42	Caucasian	.21	.24	.20	.10	.11	.16
	Black	.08	.13	−.05	−.01	−.11	.21
	Other Minority	–	–	–	–	–	–
	Male	.17	.26	.18	.14	.10	.20
	Female	.21	.13	.12	.19	.08	.09
	Total	.18	.26	.22	.13	.10	.21
43	Caucasian	.43	.40	.29	.35	.40	.38
	Black	.37	.45	−.01	.46	.51	.26
	Other Minority	–	–	–	–	–	–
	Male	.41	.47	.43	.41	.41	.51
	Female	.38	.37	.20	.35	.48	.29
	Total	.39	.43	.28	.39	.43	.38

Table 3. **Validity and Contribution to Prediction of Final School Grade of Educational Background and Test Data**

Group	Predictors[a] (I) Tests + EI	(II) Tests Only	(III) EI Only	F for Contribution of: Tests	EI
01	.54	.47	.38	30.53	29.56
02	.47	.36	.40	7.69	23.76
03	.46	.40	.25	33.80	21.73
04	.42	.40	.22	69.00	10.34
05	.41	.37	.26	32.65	21.77
06	.49	.46	.28	230.17	92.73
07	.50	.48	.30	66.76	20.22
08	.40	.36	.27	126.45	81.38
09	.43	.37	.32	8.66	9.57
10	.40	.34	.23	19.00	15.55
11	.37	.32	.20	16.07	10.47
12	.59	.54	.40	13.59	8.17
13	.46	.44	.26	251.70	54.01
14	.56	.55	.31	35.03	6.03*
15	.43	.42	.24	463.23	106.62
16	.54	.51	.32	242.55	78.11
17	.41	.40	.19	23.40	4.89*
18	.45	.42	.21	98.74	27.64
19	.42	.40	.22	86.99	25.00
20	.55	.48	.45	14.16	20.80
21	.58	.57	.26	56.23	6.75
22	.35	.32	.13	15.18	4.17
23	.41	.38	.24	57.13	27.77
24	.50	.49	.18	162.42	17.19
25	.38	.38	.16	41.07	3.43[b]
26	.54	.49	.37	27.40	19.82
27	.32	.29	.20	23.79	15.15
28	.45	.42	.28	16.63	5.62*
29	.48	.44	.28	153.82	80.37
30	.18	.14	.09	4.70	4.66*
31	.32	.31	.15	28.99	5.00*
32	.38	.32	.27	81.10	96.92
33	.33	.30	.17	36.22	12.98
34	.42	.41	.25	38.19	6.52*
35	.37	.34	.23	129.97	69.56
36	.54	.51	.33	86.72	29.41
37	.36	.31	.24	136.60	136.60
38	.46	.42	.30	102.71	51.91
39	.49	.43	.32	118.79	92.71
40	.50	.45	.33	176.04	124.01
41	.46	.40	.31	20.70	17.10
42	.31	.27	.18	14.70	11.68
43	.54	.49	.39	31.57	24.94

[a]Predictors for the R's in the columns are:
I = AFQT, Selector AI, and Education Index
II = AFQT and Selector AI
III = Education Index only.

[b]Not significant. All other F's are significant at or beyond the .01 level.

*Significant at the .05 but not at the .01 level.

Table 4. **Regression Problems Computed[a] to Test Homogeneity of Race or Sex Based Equations for the Prediction of Technical Training School Success**

Problem	Predictors
1	AFQT, Selector AI
2	Education Index
3	AFQT, Selector AI, Education Index
4	Race, AFQT, Selector AI
5	Race, (Race x AFQT), (Race x Selector AI)
6	Race, Education Index
7	Race, (Race x Education Index)
8	Race, AFQT, Selector AI, Education Index
9	Race, (Race x AFQT), (Race x Selector AI), (Race x Education Index)
10	Sex, AFQT, Selector AI
11	Sex, (Sex x AFQT), (Sex x Selector AI)
12	Sex, Education Index
13	Sex, (Sex x Education Index)
14	Sex, AFQT, Selector AI, Education Index
15	Sex, (Sex x AFQT), (Sex x Selector AI), (Sex x Education Index)

[a]In all cases, the criterion was final school grade.

Table 5. **Hypotheses re Homogeneity of Separate Race and Sex Prediction Equations**

	Hypothesis[b]	Problems Compared[a]
1.	Knowledge of race contributes nothing to test based predictions of final school grade.	5 and 1
	1a. Race equation slopes are homogeneous.	5 and 4
2.	Knowledge of race contributes nothing to EI based prediction of final school grade.	7 and 2
	2a. Equation slopes are homogeneous.	7 and 6
3.	Knowledge of race contributes nothing to test and EI based prediction of final school grade.	9 and 3
	3a. Equation slopes are homogeneous.	9 and 8
4.	Knowledge of sex contributes nothing to test based prediction of final school grade.	11 and 1
	4a. Equation slopes are homogeneous.	11 and 10
5.	Knowledge of sex contributes nothing to EI based predictions of final school grade.	13 and 2
	5a. Equation slopes are homogeneous.	13 and 12
6.	Knowledge of sex contributes nothing to EI and test based prediction of final school grade.	15 and 3
	6a. Equation slopes are homogeneous.	15 and 14

[a]See Table 3 for problem identity.

[b]The sub-hypothesis re slope is tested only when the main hypothesis is rejected.

Table 6. **Tests of Hypotheses re Race Equity of Test Based Predictions**

Group	R^2[a] I	II	III	F for[b] H_1	H_{1a}
01	.47	.50	.51	2.45*	.43
02	.36	.42	.43	2.57*	.57
03	.40	.47	.47	4.43**	.17
04	.40	.41	.42	1.81	
05	.37	.38	.38	1.56	
06	.46	.47	.47	4.62**	.160
07	.48	.48	.49	.24	
08	.36	.37	.38	6.00**	1.07
09	.39	.41	.41	1.11	
10	.34	.34	.36	.88	
11	.32	.34	.37	2.01	
12	.54	.55	.56	.67	
13	.44	.44	.45	2.16*	2.38*
14	.55	.56	.56	.87	
15	.42	.44	.44	9.02**	6.96**
16	.51	.53	.53	6.99**	2.81*
17	.40	.42	.42	1.38	
18	.42	.43	.44	2.24*	.65
19	.40	.42	.43	4.35**	2.03
20	.48	.52	.55	3.22**	1.97
21	.57	.58	.58	1.28	
22	.32	.33	.35	.99	
23	.38	.42	.45	9.50**	6.48**
24	.49	.49	.49	.72	
25	.38	.42	.42	4.01**	.42
26	.49	.50	.51	2.39*	1.97
27	.29	.40	.40	10.81**	.38
28	.42	.44	.46	1.25	
29	.44	.46	.48	12.56**	8.76**
30	.14	.23	.27	3.85**	2.20
31	.31	.41	.43	11.01**	2.35
32	.32	.33	.34	6.05**	4.69**
33	.30	.32	.34	3.36**	3.09*
34	.41	.42	.43	1.51	
35	.34	.36	.36	9.45**	2.80*
36	.51	.54	.54	4.58**	1.45
37	.31	.38	.38	35.04**	3.71**
38	.42	.45	.46	7.63**	.63
39	.43	.51	.52	25.32**	5.00**
40	.45	.51	.51	27.13**	1.86
41	.40	.41	.42	1.00	
42	.27	.30	.31	1.80	
43	.49	.50	.51	1.20	

[a]Predictors in the four models are: I = AFQT and Selector AI (Problem 1); II = Race, AFQT, Selector AI (Problem 4); III = Race, Race x Selector AI, Race x AFQT (Problem 5).

[b]H_1 = Knowledge of race contributes nothing to test based prediction of final school grade. (Problem 5 vs. Problem 1). H_{1a} = Equation slopes are homogeneous.

*Significant at the .05 level.
**Significant at the .01 level.

Table 7. **Tests of Hypotheses re Race Equity of Educational Background Based Predictions**

Group	R^2[a] I	II	III	F for[b] H_2	H_{2a}
01	.38	.46	.46	6.40**	.81
02	.40	.48	.48	4.65**	.11
03	.25	.44	.44	14.84**	.18
04	.22	.31	.31	12.21**	1.09
05	.26	.30	.31	4.42**	2.08
06	.28	.31	.32	14.16**	3.24*
07	.30	.34	.37	8.22**	7.28**
08	.27	.30	.31	15.72**	1.49
09	.32	.38	.39	2.64*	.94
10	.23	.30	.33	4.52**	3.08*
11	.20	.28	.30	3.85**	1.33
12	.40	.50	.52	3.59**	1.18
13	.26	.31	.31	3.43**	4.24*
14	.31	.39	.41	4.55**	1.59
15	.24	.35	.35	105.36**	4.57*
16	.32	.42	.42	41.54**	3.10*
17	.19	.34	.35	6.75**	.95
18	.21	.31	.32	16.82**	3.70**
19	.22	.31	.32	16.12**	1.02
20	.45	.52	.53	3.56**	.59
21	.26	.38	.38	4.92**	.43
22	.13	.16	.16	.35	
23	.24	.36	.36	17.56**	.66
24	.18	.28	.29	15.80**	2.25
25	.16	.31	.31	10.93**	.26
26	.37	.48	.48	7.98**	.48
27	.20	.41	.41	26.52**	.30
28	.28	.37	.41	5.77**	4.31**
29	.28	.39	.39	33.26**	2.72
30	.09	.22	.22	4.13**	.33
31	.15	.38	.38	23.59**	.11
32	.27	.32	.32	17.00**	.83
33	.17	.25	.25	7.35**	1.04
34	.25	.32	.32	5.92**	.55
35	.23	.31	.31	32.54**	.15
36	.33	.44	.44	17.65**	1.31
37	.24	.38	.38	89.21**	2.62
38	.30	.39	.40	26.31**	.56
39	.32	.48	.49	59.99**	4.38*
40	.33	.47	.47	67.32**	2.31
41	.31	.34	.34	1.39	
42	.18	.26	.27	4.05**	.76
43	.39	.44	.46	5.88**	3.20*

[a]Predictors in the four models are: I = Education Index (Problem 2); II = Race, Education Index (Problem 6); III = Race, Race x Education Index (Problem 7).

[b]H_2= Knowledge of race contributes nothing to EI based prediction of final school grade (Problem 7 vs. Problem 1). H_{2a} = Equation slopes are homogeneous (Problem 7 vs. Problem 6).

*Significant at the .05 level.
**Significant at the .01 Level.

Table 8. **Tests of Hypotheses re Race Equity of Educational Background and Test Data Based Predictions**

Group	R^a			F for[b]	
	I	II	III	H_3	H_{3a}
01	.54	.57	.58	2.09*	.51
02	.47	.51	.52	1.80	
03	.46	.52	.52	4.05**	.02
04	.42	.43	.43	1.95	
05	.41	.42	.42	.86	
06	.49	.50	.50	3.61**	1.39
07	.50	.51	.53	2.48*	1.92
08	.40	.41	.41	5.02**	1.13
09	.43	.47	.48	1.25	
10	.40	.40	.44	1.37	
11	.37	.39	.42	1.62	
12	.59	.60	.62	.77	
13	.46	.46	.46	1.69	
14	.56	.57	.59	1.16	
15	.43	.46	.46	24.15**	3.64**
16	.54	.56	.56	6.00**	1.19
17	.41	.44	.45	1.54	
18	.45	.46	.47	3.08**	1.60
19	.42	.44	.45	3.95**	1.64
20	.55	.58	.61	2.68**	1.53
21	.58	.59	.60	1.16	
22	.35	.35	.38	.94	
23	.41	.45	.48	7.15**	3.77**
24	.50	.50	.50	.89	
25	.38	.42	.42	2.92**	.33
26	.54	.58	.58	1.90	
27	.32	.43	.43	8.88**	.06
28	.45	.47	.50	1.71	
29	.48	.50	.52	10.18**	5.60**
30	.18	.25	.29	2.87**	1.53
31	.32	.42	.44	8.70**	1.59
32	.38	.40	.40	4.71**	2.40*
33	.33	.34	.36	2.91**	2.45*
34	.42	.44	.44	1.30	
35	.37	.39	.40	7.90**	2.02
36	.54	.57	.57	3.89**	1.44
37	.36	.42	.43	28.87**	1.96
38	.46	.49	.50	7.91**	1.03
39	.49	.55	.56	18.85**	2.60*
40	.50	.55	.56	20.42**	10.93**
41	.46	.46	.47	.71	
42	.31	.34	.36	1.67	
43	.54	.56	.57	1.60	

[a]Predictors in the four models are: I = AFQT, Selector AI, Education Index (Problem 3); II = Race, AFQT, Selector AI, Education Index (Problem 8); III = Race, Race x AFQT, Race x Selector AI, Race x Education Index (Problem 9).

[b]H_3 = Knowledge of race contributes nothing to test and EI based prediction of final school grade (Problem 9 vs. Problem 3). H_{3a} = Equation slopes are homogeneous (Problem 9 vs. Problem 8).

*Significant at the .05 level.

**Significant at the .01 level.

hypothesis being rejected for 10 of these. Thus, it can be seen that predictions based on educational information are much more susceptible to race bias than are those based on test data. From Table 8, it can be seen that, when separate race predictions are based on a combination of test and educational data, the null hypothesis is rejected only about as often as for the test data alone.

Tables 9, 10, and 11 summarize tests of homogeneity of prediction equations for males and females. Homogeneity of test based predictions (Table 9) and of educational data based predictions (Table 10) is rejected with equal frequency for separate sex group equations. However, slope homogeneity is rejected only once for the educational data based predictions as compared with nine times for test based predictions.

IV. CONCLUSIONS AND RECOMMENDATIONS

These analyses suggest that, while predictions based on joint consideration of test and educational data have useful validity across race and sex groups, selection strategies which consider race and sex may further improve the system.

The data indicate several things of practical interest. Both test data and educational background data demonstrated usefulness for prediction of Air Force technical training performance; moreover, when used in combination with each other, more accurate predictions are possible than through the use of either alone. Generally, of the two kinds of data, test data alone provided more accurate predictions than did educational background data alone, and, moreover, introduction of test data to a prediction equation based on educational background provided a larger increase in prediction accuracy than was achieved with introduction of educational background into a test-based prediction equation. These observations also hold for prediction equations based on specific race or sex subsamples.

Another finding of particular note was that, in many instances, separate race or sex group prediction equations are not homogeneous (i.e., the subgroup equations differ from each other enough that added accuracy in prediction is achieved by using a separate equation for each subgroup); this observation is more often true for race based subgroups and for predictions based on

Table 9. **Tests of Hypotheses re Sex Equity of Test Based Predictions**

	R[a]			F for[b]	
Group	I	II	III	H_4	H_{4a}
01	.47	.47	.48	1.03	
02	.36	.36	.37	.51	
03	.40	.41	.42	2.21	
04	.40	.41	.41	.65	
05	.37	.37	.37	.48	
06	.46	.46	.46	1.76	
07	.48	.48	.49	2.95*	3.70*
08	.36	.36	.37	6.93**	10.10**
09	.37	.40	.41	1.97	
11	.32	.35	.36	2.58	
12	.54	.54	.57	1.52	
13	.44	.44	.44	1.70	
14	.55	.55	.58	3.60*	5.04**
15	.42	.42	.43	20.55**	30.47**
16	.51	.51	.53	12.44**	18.53**
17	.40	.40	.40	.30	.45
20	.48	.53	.53	4.44	
22	.32	.34	.36	2.25	
23	.38	.38	.40	4.48**	5.70**
24	.49	.49	.49	4.50**	5.46**
25	.38	.38	.40	4.57**	6.76**
27	.29	.29	.29	1.36	
28	.42	.42	.46	3.04*	4.54
29	.44	.44	.44	.89	
30	.14	.28	.29	9.03**	.62
31	.31	.31	.31		
32	.32	.32	.32	1.04	
33	.30	.31	.33	5.85**	8.15**
34	.41	.41	.42	1.28	
35	.34	.34	.34	3.58*	.89
36	.51	.52	.52	1.11	
38	.42	.44	.44	9.08**	.33
39	.43	.44	.44	5.13**	1.35
40	.45	.45	.45	3.41*	2.62
41	.40	.41	.41	.91	
42	.27	.29	.30	2.21	
43	.49	.50	.50	1.93	

[a]Predictors in the four models are: I = AFQT, Selector AI (Problem 1); II = Sex, AFQT, Selector AI (Problem 10); III = Sex, Sex x AFQT, Sex x Selector AI (Problem 11).

[b]H_4 = Knowledge of sex contributes nothing to test based prediction of final school grade (Problem 11 vs. Problem 1). H_{4a} = Equation slopes are homogeneous (Problem 11 vs. Problem 10).

*Significant at the .05 level.

**Significant at the .01 level.

Table 10. **Tests of Hypotheses re Sex Equity of Educational Background Based Predictions**

	R[a]			F for[b]	
Group	I	II	III	H_5	H_{5a}
01	.38	.41	.41	3.84*	.20
02	.40	.40	.40	.19	
03	.25	.26	.26	.47	
04	.22	.22	.22	.71	
05	.26	.26	.26	.18	
06	.28	.29	.29	8.63**	
07	.30	.30	.30	.73	
08	.27	.27	.27	1.85	
09	.32	.37	.37	3.52*	.08
11	.20	.27	.27	5.01**	.32
12	.40	.41	.44	2.23	
13	.26	.26	.26	4.55*	2.35
14	.31	.38	.38	6.35**	.30
15	.24	.26	.26	28.24**	
16	.32	.32	.32	.88	
17	.19	.19	.26	5.02**	9.65**
20	.45	.48	.48	2.88	
22	.13	.15	.16	.73	
23	.24	.24	.24	.52	
24	.18	.21	.21	7.51**	2.52
25	.16	.17	.17	.63	
27	.20	.21	.21	1.25	
28	.28	.29	.30	1.14	
29	.28	.28	.28	2.68	
30	.09	.26	.27	13.38**	1.11
31	.15	.15	.15		
32	.27	.27	.27	1.71	
33	.17	.18	.18	1.46	2.21
34	.25	.25	.27	1.70	
35	.23	.25	.26	20.01**	2.54
36	.33	.34	.34	3.78*	1.31
38	.30	.33	.33	13.32**	.30
39	.32	.33	.33	4.82**	1.38
40	.33	.33	.33	2.03	
41	.31	.32	.34	2.78	
42	.18	.23	.23	4.38*	
43	.39	.40	.40	1.77	

[a]Predictors in the four models are: I = Education Index (Problem 2); II = Sex, Education Index (Problem 12); III = Sex, Sex x Education Index (Problem 13).

[b]H_5 = Knowledge of sex contributes nothing to Education Index based prediction of final school grade (Problem 13 vs. Problem 2). H_{5a} = Equation slopes are homogeneous (Problem 13 vs. Problem 12).

*Significant at the .05 level.

**Significant at the .01 level.

Table 11. **Tests of Hypotheses re Sex Equity of Educational Background and Test Data Based Predictions**

Group	R[a]			F for[b]	
	I	II	III	H_6	H_{6a}
01	.54	.55	.55	.90	
02	.47	.47	.47	.42	
03	.46	.46	.47	1.06	
04	.42	.42	.42	1.06	
05	.41	.41	.41	.27	
06	.49	.50	.50	2.14	
07	.50	.50	.51	1.90	
08	.40	.40	.41	5.43**	6.27**
09	.43	.46	.47	1.92	
11	.37	.39	.40	2.42*	1.26
12	.59	.59	.60	.84	
13	.46	.46	.46	2.08	
14	.56	.57	.59	2.77*	3.42*
15	.43	.43	.44	16.76**	22.37**
16	.54	.54	.55	7.79**	10.14**
17	.41	.41	.45	2.72*	3.53*
20	.55	.58	.58	2.99*	
22	.35	.36	.38	1.87	
23	.41	.42	.43	3.62**	4.35**
24	.50	.50	.51	4.08**	4.82**
25	.38	.38	.41	3.47*	4.32**
27	.32	.32	.32	.92	
28	.45	.45	.49	2.70*	3.44*
29	.48	.48	.48	.90	
30	.18	.30	.31	6.80**	.62
31	.32	.32	.32	.02	
32	.38	.38	.39	1.69	
33	.33	.33	.35	4.68**	5.89**
34	.42	.42	.44	1.99	
35	.37	.38	.38	5.99**	1.64
36	.54	.55	.55	1.35	
38	.46	.47	.47	5.69**	1.04
39	.49	.50	.50	4.92**	2.11
40	.50	.50	.50	4.13**	1.53
41	.46	.46	.48	2.28	
42	.31	.34	.34	1.71	
43	.54	.55	.56	1.98	

[a]Predictors in the four models are: I = Education Index, AFQT, Selector AI (Problem 3); II = Sex, AFQT, Selector AI, Education Index (Problem 14); III = Sex, Sex x AFQT, Sex x Selector AI, Sex x Education Index (PRoblem 15).

[b]H_6 = Knowledge of sex contributes nothing to EI and test based predictions of final school grade (Problem 15 vs. Problem 3). H_{6a} = Equation slopes are homogeneous (Problem 15 vs. Problem 14).

*Significant at the .05 level.

**Significant at the .01 level.

educational background data. In all but two instances, there were significant differences in the separate race equations for predicting technical training performance from educational background. In most instances, the data suggest that differences in race-based prediction equation are attributable to the equations' intercepts; that is, while usually the predicted technical training grade increases for each subgroup by about the same amount for each increase of one score unit on the predictor, the *constants* added into the equations differ. This results in parallel prediction lines for the subgroups which differ mainly in level.

Table A3 of the Appendix demonstrates the impact of these equation differences. This table was developed from the separate caucasian and Black subgroup equations for predicting training performance from test and educational background data. From this table, it can be seen that, when total group means on the selector AI, AFQT, and EI are substituted into the caucasian and Black prediction equations, a lower criterion value is predicted by the Black equation. Thus, when a single overall equation is used, the tendency would be to predict higher Black criterion performance tnan is observed.

It is noted that, while use of educational background can enhance prediction accuracy, these data are also more subject to bias than are test data. Consequently, use of educational background data in selection and classification decisions should not be seriously considered at this time. With respect to modification of test prediction systems to take account of minority group membership, the data indicate that the tendency is to overpredict minority performance. Adjustments to "correct" this would result in reduced qualification rates among minorities, a consequency which is not in keeping with equal opportunity goals.

More intensive analysis of the data base for this study will be conducted under other studies. At the present time, item response data are being added to the files; this will allow generation of all subtest and raw composite scores. Later investigations will examine appropriateness of composites as presently constituted, seek more valid composites, consider the number of composites needed, and will examine fairness of these with respect to both race and sex. It is anticipated that major usefulness of this study and planned follow-on studies will be in provision of data for test battery revisions and improvement.

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APPENDIX A. DESCRIPTIVE STATISTICS

Table A1. **Within Ethnic Group Means and Standard Deviations**

Group	Sample	Educ Index		AFQT		Selector AI		Final School Grade	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
01	Caucasian	1.58	.167	74.03	14.75	82.57	9.86	85.71	6.26
	Black	1.44	.159	64.93	13.64	80.34	7.42	81.07	5.36
	Other	–	–	–	–	–	–	–	–
	Total	1.56	1.65	72.76	14.94	82.31	9.58	85.06	6.36
02	Caucasian	4.09	1.65	64.65	15.43	72.34	10.78	82.58	6.90
	Black	3.65	1.67	55.51	13.55	68.14	9.28	76.93	8.00
	Other	–	–	–	–	–	–	–	–
	Total	4.00	1.66	64.01	15.71	71.50	10.63	81.45	7.48
03	Caucasian	3.46	1.80	77.88	12.86	88.19	5.56	89.66	4.92
	Black	3.73	1.66	66.71	13.08	85.00	4.67	84.64	4.37
	Other	–	–	–	–	–	–	–	–
	Total	3.50	1.78	76.11	13.55	87.69	5.55	88.91	5.15
04	Caucasian	2.53	1.67	67.21	15.97	74.89	12.14	86.82	5.36
	Black	2.80	1.64	54.84	14.75	69.89	12.29	84.36	5.21
	Other	–	–	–	–	–	–	–	–
	Total	2.60	1.67	63.92	16.55	73.55	12.41	86.16	5.43
05	Caucasian	2.96	1.69	62.06	14.47	72.09	10.10	85.64	7.18
	Black	2.73	1.77	54.29	15.46	68.62	8.45	83.13	7.66
	Other	–	–	–	–	–	–	–	–
	Total	2.89	1.73	59.39	15.32	70.90	9.74	84.76	7.47
06	Caucasian	2.88	2.69	79.17	12.88	85.01	7.29	85.09	6.01
	Black	2.66	2.70	69.07	14.65	82.35	6.98	81.83	5.34
	Other	4.04	2.58	68.98	16.46	82.36	8.04	84.60	6.42
	Total	2.89	2.69	78.04	13.53	84.71	7.33	84.79	6.03
07	Caucasian	3.53	2.02	78.58	12.16	84.60	7.68	86.01	6.14
	Black	4.11	1.94	67.87	13.04	82.83	5.62	83.00	6.34
	Other	–	–	–	–	–	–	–	–
	Total	3.57	2.01	77.48	12.71	84.37	7.58	85.75	6.22
08	Caucasian	6.73	2.83	79.63	12.66	85.26	7.17	84.35	6.38
	Black	6.62	2.94	71.07	13.01	83.32	6.96	81.12	6.44
	Other	7.07	3.13	72.21	15.31	85.70	6.91	85.28	5.95
	Total	6.73	2.85	78.61	13.05	85.08	7.17	84.05	6.45
09	Caucasian	3.34	2.09	78.79	12.86	85.71	6.56	84.94	5.22
	Black	–	–	–	–	–	–	–	–
	Other	–	–	–	–	–	–	–	–
	Total	3.39	2.11	78.64	12.65	85.73	6.51	84.79	5.22
10	Caucasian	1.47	.93	59.27	15.48	60.95	16.24	78.69	7.18
	Black	1.50	.82	47.03	10.67	46.21	10.59	75.58	5.92
	Other	–	–	–	–	–	–	–	–
	Total	1.47	.91	56.60	15.31	57.66	16.25	78.02	7.04

Table A1 (*Continued*)

Group	Sample	Educ Index		AFQT		Selector AI		Final School Grade	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
11	Caucasian	.89	.67	65.64	14.51	67.63	11.98	78.55	6.46
	Black	.99	.77	55.94	13.25	65.80	8.58	75.65	5.98
	Other	–	–	–	–	–	–	–	–
	Total	.92	.70	63.37	14.66	67.28	11.29	77.87	6.50
12	Caucasian	.84	1.24	68.04	16.42	74.13	10.75	82.60	6.78
	Black	.33	1.11	49.67	13.70	64.17	4.93	77.83	4.05
	Other	–	–	–	–	–	–	–	–
	Total	.74	1.21	63.15	17.54	71.41	10.51	81.24	6.55
13	Caucasian	3.90	2.21	56.02	15.01	48.87	21.78	83.13	7.56
	Black	3.75	2.15	47.21	12.65	36.58	15.50	80.41	6.62
	Other	4.28	2.61	48.51	12.82	37.09	16.75	81.62	7.39
	Total	3.86	2.20	52.40	14.72	43.78	20.37	82.04	7.33
14	Caucasian	2.41	1.79	63.15	15.90	68.60	21.73	81.48	7.32
	Black	–	–	–	–	–	–	–	–
	Other	–	–	–	–	–	–	–	–
	Total	2.34	1.75	61.32	16.04	66.47	21.84	80.69	7.61
15	Caucasian	1.35	2.02	59.88	15.99	62.06	20.62	84.42	7.78
	Black	1.31	2.04	50.54	13.99	51.23	17.12	79.19	7.92
	Other	1.62	2.36	51.42	13.09	56.97	17.14	82.57	7.26
	Total	1.35	2.03	57.98	16.03	59.94	20.40	83.41	8.06
16	Caucasian	3.89	1.89	60.00	16.45	64.32	17.66	85.31	7.41
	Black	3.81	1.82	48.41	12.55	51.60	12.08	80.02	7.00
	Other	4.11	2.04	53.25	16.51	53.64	14.82	84.27	7.55
	Total	3.88	1.88	57.45	16.42	61.44	17.42	84.20	7.63
17	Caucasian	1.44	.98	58.94	16.58	64.77	12.61	84.68	6.38
	Black	1.54	1.05	47.85	14.10	56.54	7.88	80.21	5.52
	Other	–	–	–	–	–	–	–	–
	Total	1.46	1.00	56.86	16.72	63.31	12.29	83.87	6.45
18	Caucasian	2.45	1.68	58.54	15.49	72.35	12.65	89.28	4.99
	Black	2.81	1.59	53.55	12.50	60.59	14.14	86.39	5.29
	Other	–	–	–	–	–	–	–	–
	Total	2.51	1.67	57.74	15.15	70.35	13.59	88.82	5.15
19	Caucasian	2.20	1.81	60.01	15.86	72.98	12.56	89.52	5.05
	Black	2.26	1.79	50.37	13.23	63.08	12.77	86.19	5.24
	Other	–	–	–	–	–	–	–	–
	Total	2.20	1.81	58.51	15.89	71.49	13.07	89.02	5.24
20	Caucasian	4.48	2.03	76.71	13.86	84.59	8.39	90.77	4.42
	Black	–	–	–	–	–	–	–	–
	Other	–	–	–	–	–	–	–	–
	Total	4.43	2.03	75.82	14.22	84.09	8.45	90.38	4.67
21	Caucasian	.90	1.55	60.70	17.00	73.80	16.48	79.23	7.33
	Black	.64	1.39	48.11	10.18	55.00	11.95	72.00	6.51
	Other	–	–	–	–	–	–	–	–
	Total	.87	1.53	59.33	16.82	71.76	17.06	78.51	7.53

Table A1 (*Continued*)

Group	Sample	Educ Index		AFQT		Selector AI		Final School Grade	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
22	Caucasian	.09	.29	83.00	12.36	86.49	10.47	84.30	7.01
	Black	–	–	–	–	–	–	–	–
	Other	–	–	–	–	–	–	–	–
	Total	.10	.30	82.49	12.46	86.13	10.59	84.30	7.08
23	Caucasian	3.00	1.83	59.20	16.57	63.12	17.13	84.54	6.99
	Black	2.92	1.80	49.16	10.98	53.16	14.25	79.51	6.86
	Other	–	–	–	–	–	–	–	–
	Total	2.99	1.83	57.11	16.16	61.05	17.16	83.54	7.26
24	Caucasian	1.85	1.73	59.48	15.07	57.18	20.73	82.23	7.38
	Black	1.91	1.63	51.06	12.54	41.90	16.52	78.64	6.96
	Other	–	–	–	–	–	–	–	–
	Total	1.88	1.72	57.15	14.92	52.98	20.81	81.26	7.42
25	Caucasian	2.51	1.52	59.68	16.53	61.24	17.46	82.45	7.04
	Black	1.95	1.43	50.13	14.41	47.53	15.52	76.39	7.01
	Other	–	–	–	–	–	–	–	–
	Total	2.43	1.52	58.52	16.63	59.37	17.78	81.63	7.32
26	Caucasian	2.20	1.65	54.54	15.90	59.51	17.10	80.92	6.80
	Black	2.83	1.96	46.00	9.42	47.78	10.03	75.61	7.20
	Other	–	–	–	–	–	–	–	–
	Total	2.29	1.71	53.32	15.43	57.83	16.79	80.16	7.11
27	Caucasian	2.67	1.61	59.95	16.29	66.68	14.64	87.05	5.23
	Black	2.71	1.49	82.52	5.46	59.65	13.15	82.52	5.46
	Other	–	–	–	–	–	–	–	–
	Total	2.68	1.58	56.58	16.36	64.68	14.50	85.81	5.66
28	Caucasian	2.39	1.91	53.92	15.45	54.61	15.74	85.29	5.43
	Black	2.21	1.55	46.12	10.09	44.88	8.13	81.88	4.74
	Other	–	–	–	–	–	–	–	–
	Total	2.38	1.86	52.39	14.84	52.71	15.02	84.63	5.48
29	Caucasian	2.41	1.79	58.07	16.63	53.92	18.22	83.11	6.58
	Black	2.41	1.58	46.45	12.66	51.10	15.44	79.08	5.94
	Other	3.38	2.06	54.05	13.29	51.38	14.70	82.75	5.83
	Total	2.43	1.75	54.96	16.42	53.13	17.51	82.06	6.64
30	Caucasian	.51	.60	55.31	14.04	60.37	13.70	87.57	6.38
	Black	.44	.66	49.71	12.86	57.50	11.66	84.68	7.69
	Other	–	–	–	–	–	–	–	–
	Total	.49	.62	53.31	14.05	59.41	13.24	86.51	7.03
31	Caucasian	.83	.88	58.17	15.96	63.04	15.40	91.73	5.26
	Black	.86	.87	47.46	13.24	56.77	11.98	87.45	6.10
	Other	–	–	–	–	–	–	–	–
	Total	.84	.87	53.70	15.80	60.40	14.44	89.88	6.03
32	Caucasian	3.31	1.92	60.88	16.59	68.58	14.35	84.75	7.14
	Black	3.18	1.86	51.33	14.70	62.81	16.02	81.92	6.86
	Other	4.61	2.25	55.81	18.30	67.95	16.30	83.61	7.26
	Total	3.32	1.94	57.66	16.67	66.74	15.22	83.81	7.18

Table A1 (*Continued*)

Group	Sample	Educ Index		AFQT		Selector AI		Final School Grade	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
33	Caucasian	1.04	1.08	55.16	15.56	63.07	14.32	83.53	7.38
	Black	1.08	1.09	45.68	12.13	57.40	12.10	80.96	7.16
	Other	–	–	–	–	–	–	–	–
	Total	1.07	1.10	50.95	14.96	60.58	13.70	82.45	7.40
34	Caucasian	4.46	2.18	70.52	18.57	87.57	5.88	80.84	7.79
	Black	4.15	2.15	57.92	16.20	86.90	5.74	76.76	7.68
	Other	–	–	–	–	–	–	–	–
	Total	4.42	2.18	68.10	18.77	87.47	5.84	80.03	7.93
35	Caucasian	2.86	1.81	55.80	15.63	63.67	14.76	84.55	6.57
	Black	2.86	1.71	47.22	12.35	57.29	14.14	81.69	6.34
	Other	4.27	2.17	49.98	13.72	59.46	12.98	85.43	7.12
	Total	2.89	1.79	52.17	14.94	60.97	14.81	83.40	6.65
36	Caucasian	2.70	2.09	63.60	16.03	74.04	11.91	87.73	5.56
	Black	2.12	1.89	50.66	14.62	70.06	11.14	83.45	5.46
	Other	–	–	–	–	–	–	–	–
	Total	2.57	2.08	59.81	16.80	72.87	11.81	86.48	5.89
37	Caucasian	8.65	2.37	57.62	16.08	62.37	14.63	86.36	6.67
	Black	8.54	2.25	47.74	13.41	56.61	12.87	81.76	7.43
	Other	8.98	2.92	55.39	16.80	61.25	13.70	83.66	8.24
	Total	8.62	2.34	54.08	15.91	60.31	14.29	84.69	7.31
38	Caucasian	2.82	1.83	60.68	15.83	68.69	12.96	83.61	5.90
	Black	3.09	1.82	51.08	13.76	64.65	12.33	79.82	6.66
	Other	–	–	–	–	–	–	–	–
	Total	2.87	1.83	58.77	15.88	67.87	12.95	82.87	6.23
39	Caucasian	4.05	2.19	66.24	16.23	75.20	12.05	82.79	7.66
	Black	3.76	2.00	54.54	15.42	70.80	10.38	76.83	7.84
	Other	5.61	2.43	58.93	18.91	73.75	13.34	83.29	8.05
	Total	4.00	2.16	62.63	16.92	73.87	11.78	81.72	8.35
40	Caucasian	4.02	2.05	66.90	15.96	76.64	11.04	82.44	6.98
	Black	3.65	2.08	55.79	15.87	72.28	10.32	76.27	6.97
	Other	5.29	2.25	63.65	19.14	78.65	11.12	81.88	7.81
	Total	3.96	2.08	64.07	16.72	75.61	11.04	80.90	7.48
41	Caucasian	2.36	1.33	66.55	15.57	76.08	10.99	80.96	6.17
	Black	2.27	1.22	52.63	15.28	71.98	11.31	78.69	6.33
	Other	–	–	–	–	–	–	–	–
	Total	2.35	1.32	64.36	16.36	75.45	11.16	80.57	6.25
42	Caucasian	−1.09	.58	58.73	16.63	63.86	15.10	82.50	6.41
	Black	−1.10	.61	47.65	15.07	58.57	13.87	79.22	6.41
	Other	–	–	–	–	–	–	–	–
	Total	−1.09	.59	56.92	16.79	63.02	14.99	81.96	6.49
43	Caucasian	1.46	1.51	64.07	16.66	73.78	10.36	82.95	7.78
	Black	1.29	1.38	54.59	13.24	70.51	9.08	79.00	6.83
	Other	–	–	–	–	–	–	–	–
	Total	1.43	1.50	61.83	16.46	72.75	10.29	81.99	7.73

Table A2. **Within Sex Means and Standard Deviations**

Group	Sample	Educ Index		AFQT		Selector AI		Final School Grade	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
01	Male	1.55	1.69	73.49	14.83	83.28	8.46	85.50	6.23
	Female	1.62	1.50	69.64	15.00	78.18	12.52	83.20	6.53
02	Male	4.02	1.65	64.39	15.73	71.97	10.63	81.36	7.58
	Female	3.94	1.72	61.74	15.41	68.71	10.16	82.00	6.90
03	Male	3.70	1.82	77.06	13.52	87.75	5.45	89.18	5.24
	Female	2.92	1.51	73.36	13.27	87.50	5.82	88.12	4.77
04	Male	2.68	1.68	64.78	16.50	74.03	12.41	86.19	5.40
	Female	2.07	1.51	57.97	15.67	70.26	11.88	85.94	5.64
05	Male	2.94	1.76	60.06	15.97	70.78	9.36	84.75	7.51
	Female	2.75	1.64	57.65	13.33	71.20	10.68	84.78	7.35
06	Male	2.77	2.66	77.70	13.58	85.20	7.25	84.95	6.03
	Female	3.46	2.76	79.74	13.17	82.22	7.27	83.97	5.99
07	Male	3.60	2.02	77.47	12.79	85.17	7.45	85.87	6.25
	Female	3.40	1.94	77.57	12.23	80.00	6.77	85.06	6.01
08	Male	6.94	2.83	77.92	13.19	85.62	7.11	84.07	6.42
	Female	5.76	2.74	81.65	11.98	82.63	6.91	83.96	6.59
09	Male	3.52	2.11	78.34	12.65	86.01	6.48	84.55	5.29
	Female	–	–	–	–	–	–	–	–
11	Male	.93	.70	62.82	14.50	67.18	11.32	77.63	6.42
	Female	–	–	–	–	–	–	–	–
12	Male	.72	1.20	62.69	17.39	71.29	10.43	81.13	6.38
	Female	–	–	–	–	–	–	–	–
13	Male	4.13	2.16	51.46	14.81	47.53	19.93	82.45	7.29
	Female	2.77	2.05	56.13	13.76	28.86	14.36	80.44	7.26
14	Male	2.35	1.80	60.41	16.21	73.64	15.70	81.54	7.43
	Female	2.32	1.53	64.98	14.75	37.61	19.11	77.27	7.38
15	Male	1.54	2.07	57.03	16.51	66.17	16.46	83.99	7.99
	Female	.68	1.72	61.34	13.68	38.00	17.59	81.34	7.98
16	Male	3.97	1.88	56.46	16.58	64.19	17.59	84.42	7.74
	Female	3.52	1.85	61.71	14.97	49.58	10.19	83.26	7.07
17	Male	1.35	.97	55.04	16.09	64.56	12.52	83.81	6.39
	Female	2.28	.80	69.87	15.24	54.31	4.27	84.28	6.89
20	Male	4.44	2.03	75.75	14.22	84.11	8.47	90.45	4.57
	Female	–	–	–	–	–	–	–	–
22	Male	.10	.30	83.42	12.31	86.72	10.64	83.98	7.20
	Female	.08	.27	80.51	12.54	84.88	10.37	84.99	6.75
23	Male	2.97	1.86	56.24	16.10	64.54	16.21	83.46	7.20
	Female	3.10	1.71	60.50	15.93	47.38	13.59	83.83	7.48
24	Male	1.86	1.70	56.26	14.99	57.43	18.78	81.56	7.35
	Female	2.02	1.78	61.92	13.56	29.12	13.71	79.62	7.57
25	Male	2.72	1.46	58.00	17.04	63.13	16.89	82.00	7.22
	Female	1.26	1.14	60.61	14.73	44.50	12.69	80.15	7.52

Table A2 (*Continued*)

Group	Sample	Educ Index		AFQT		Selector AI		Final School Grade	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
27	Male	2.68	1.58	56.57	16.37	64.69	14.51	85.81	5.66
	Female	–	–	–	–	–	–	–	–
28	Male	2.50	1.86	51.01	14.28	53.12	15.47	84.59	5.46
	Female	1.59	1.65	61.69	15.20	50.00	11.22	84.86	5.61
29	Male	2.39	1.74	54.82	16.68	51.13	16.98	81.87	6.61
	Female	2.72	1.76	55.87	14.55	66.58	14.87	83.34	6.72
30	Male	.49	.63	54.05	14.85	60.56	13.60	85.40	7.35
	Female	.49	.61	51.53	11.67	56.62	11.85	89.20	5.30
31	Male	.85	.87	53.70	15.83	60.40	14.45	89.88	6.04
	Female	–	–	–	–	–	–	–	–
32	Male	3.44	2.00	58.34	17.19	65.24	15.55	83.78	7.19
	Female	3.05	1.77	56.03	15.35	70.23	12.77	83.87	7.17
33	Male	1.06	1.10	50.93	15.01	60.98	13.54	82.27	6.98
	Female	1.10	1.09	50.97	14.87	59.91	13.93	82.76	8.06
34	Male	4.73	2.18	69.77	18.76	87.50	5.84	80.43	7.89
	Female	3.78	2.02	64.61	18.30	87.40	5.85	79.21	7.95
35	Male	3.05	1.83	51.61	15.66	59.24	14.53	82.98	6.58
	Female	2.60	1.67	53.23	13.44	64.20	14.78	84.20	6.69
36	Male	2.66	2.13	59.48	17.37	72.43	11.65	86.22	5.96
	Female	2.35	1.93	60.63	15.22	73.97	12.13	87.14	5.67
38	Male	3.04	1.88	60.02	16.53	68.66	13.24	83.62	6.19
	Famale	2.52	1.66	56.26	14.15	66.29	12.19	81.36	6.02
39	Male	4.03	2.17	63.00	17.55	74.40	11.35	81.33	8.36
	Female	3.93	2.12	61.88	15.55	72.82	12.53	82.52	8.27
40	Male	4.11	2.09	65.27	17.23	75.97	11.24	80.87	7.49
	Female	3.65	2.02	61.60	15.33	74.88	10.57	80.97	7.48
41	Male	2.34	1.35	64.12	16.37	75.26	11.06	80.31	6.21
	Female	2.41	1.14	65.57	16.21	76.43	11.61	81.94	6.30
42	Male	−1.09	.57	57.74	17.21	63.32	15.44	82.37	6.48
	Female	−1.11	.67	52.52	13.47	61.43	12.17	79.75	6.08
43	Male	1.58	1.51	63.10	16.93	73.11	10.35	81.75	7.83
	Female	1.16	1.44	59.32	15.20	72.04	10.14	82.46	7.51

Table A3. **Technical Training Grades Predicted from Total Group Mean Predictor Scores[a]**

Group	Y′ (Caucasian Equation)	Y′ (Black Equation)
04	86.47	84.99
05	85.19	83.84
06	84.93	82.82
08	84.24	81.82
13	82.20	81.42
15	84.01	80.14
16	84.68	81.91
18	89.06	87.40
19	89.30	86.86
23	84.15	79.19
24	85.45	80.32
27	86.88	82.96
29	82.63	79.44
30	87.43	84.69
31	91.31	87.62
32	84.32	82.40
33	82.96	81.26
34	80.46	77.84
35	84.04	82.19
36	87.07	84.58
37	86.00	82.19
38	83.44	80.59
39	83.22	77.94
40	82.01	77.39

[a]Predicted criterion scores were computed only for groups with 100 or more Black students. Total Group Means on the Selector AI, the AFQT, and the Education Index were substituted into both equations.

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